Amendments to the Drawings:

The attached sheet of drawings includes changes to Figure 1 and Figure 2.

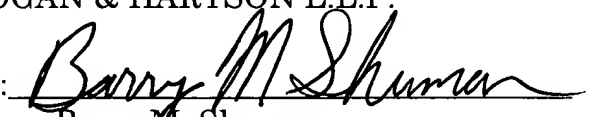
A Replacement Sheet and an Annotated Sheet showing changes to Figure 1 and Figure 2 are attached.

REMARKS:

Minor non substantive changes are made to the specification, claim 2, and Figures 1 and 2. In the specification "X-ray diffraction" was changed to --X-ray spectroscopy-- in seven places. Also, in the specification "X-ray diffractometer" was changed to --analysis of X-ray-- in one place. In claim 2 "X-ray diffraction" was changed to --X-ray spectroscopy--. In Figures 1 and 2, the label on the X-axis was changed from Wavelength to Energy Strength. Support for these changes can be found at p. 5, line 24-p. 6, line 7 of the Applicant's specification. Further support for the change in the label to the X-axis can be found in Attachments A and B, submitted concurrently herewith. Attachment A is some Japanese internet literature with an English translation of a pertinent section that gives support to the X-axis label change. Attachment B includes the original Figures 1 and 2 from the Japanese application, together with an English translation of the Japanese titles. No new matter is added.

If there are any fees due in connection with the filing of this response, please charge the fees to our Deposit Account No. 50-1314.

Respectfully submitted,
HOGAN & HARTSON L.L.P.

Date: September 29, 2004 By: 

Barry M. Shuman
Registration No. 50,220
Attorney for Applicant(s)

500 South Grand Avenue, Suite 1900
Los Angeles, California 90071
Phone: 213-337-6700
Fax: 213-337-6701

ItEM-電子顕微鏡の原理

(/)

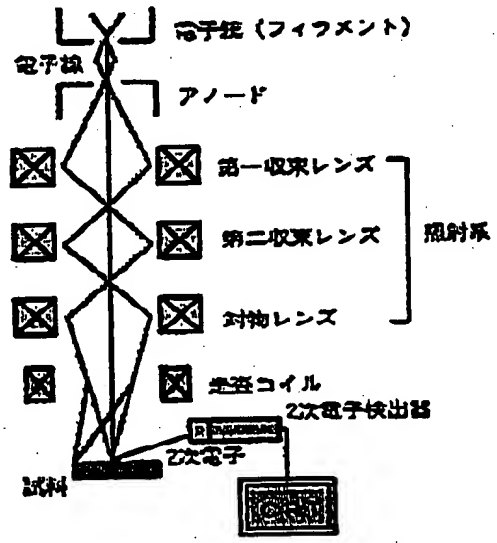
ATTACHMENT A

⇨電子顕微鏡の原理

電子顕微鏡と光学顕微鏡の大きく違うところは、光(可視光)ではなく、電子線を用いているところにあります。顕微鏡の分解能(どれだけ小さいものが観察可能か?ということ)は、波長の大きさに影響されます。波長より小さいものは観察できません。光学顕微鏡の光の波長は約400~800nmで、ほぼμオーダーまでの大きさのものしか観察できません。電子顕微鏡の場合は、電子線の波長は加速電圧によって変化しますが100kVで約0.0030nm、1000kVで約0.001nmと波長が非常に小さいため、非常に分解能が高く、顕微鏡によっては原子レベルまで観察可能です。

●走査型電子顕微鏡の構造

走査電子顕微鏡は、透過電子顕微鏡とは違い、電子銃で発生した電子線を収束させた細い電子線で試料表面を走査し、電子線を照射された部位から発生する2次電子を(凹凸の情報を含む)検出し、増幅拡大させてCRTに映し出します。そのため「電子銃とアノード」、「照射系(収束レンズ、対物レンズ)」と試料表面で電子線を走査するための「走査コイル」、2次電子を検出する「2次電子検出器」から構成されます。



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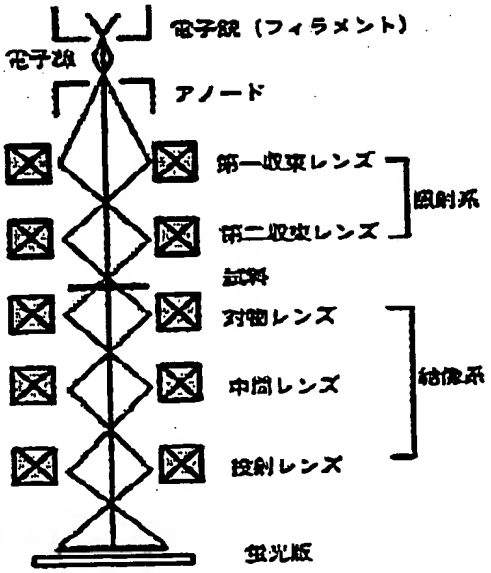


Translation

●エネルギー分散型測定装置(EDS)について

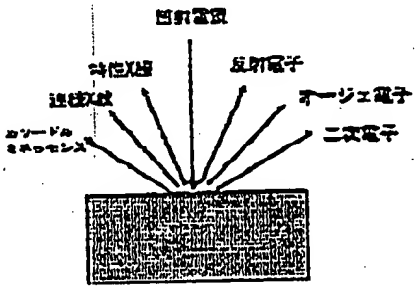
走査型電子顕微鏡、透過型電子顕微鏡に検出器をとりつけ、電子線を照射された観察領域から発生する各元素に特異的なX線(特性X線)を検出することで、試料にどのような元素がどれだけ含まれるか、また元素の分布を調べることが出来る方法です。

ItEM-電子顕微鏡の原理

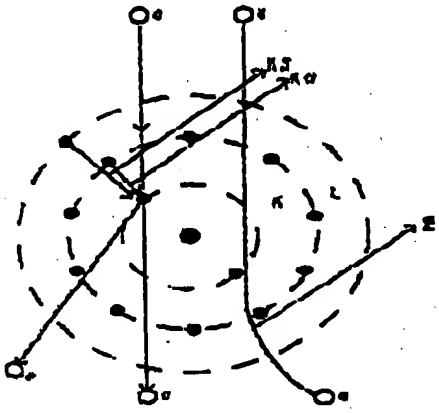
●特性X線について

試料に電子線が照射されると、先に述べた電子顕微鏡の説明で述べた2次電子のほかに、反射電子、オージェ電子、特定X線、連続X線などが試料から得られます。EDSで使用する特定X線は、電子線が照射された時に、原子を構成する軌道電子がイオン化し、外殻電子から補われる際の余分なエネルギーの放出によります。

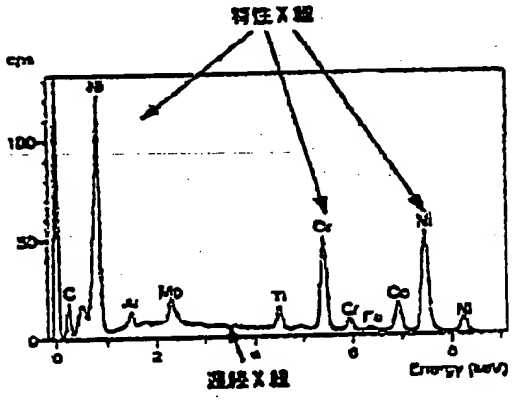
特性X線は固有のエネルギー値を持つので、そのエネルギーのピークを調べることで、その元素が何かを知ることができます。



電子線入射による各種信号の発生



特性X線の発生過程



実際に得られる特性X線のピーク

Translation

戻る

(1)

TRANSLATION-IN-PART of http://www.nims.go.jp/jr_em/japanese/em-morc.html

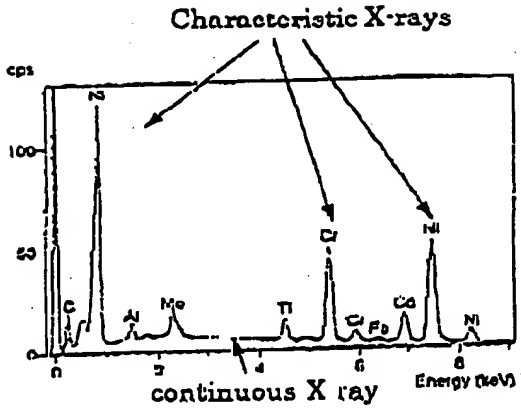
●As to Energy dispersion measurement equipment (EDS)

This is the method that can investigate kind and amount of elements contained in a sample and distribution of elements by detecting, with a detector which is attached in a scanning electron microscope or a transmission electron microscope, specific X-ray (characteristic X-ray) in each element generated from the observation area that electron beam is irradiated.

●As to Characteristic X-rays

If electron beam is irradiated to the sample, reflective electron, Auger electron, characteristic X-ray, continuous X-ray, etc. will be obtained from a sample, other than the secondary electron previously stated by explanation of a scanning electron microscope. When an electron beam is irradiated, the orbital electron which constitutes an atom is ionized, and characteristic X-ray is generated by discharge of the excessive energy at the time of being compensated from an outer shell electron.

Since characteristic X-ray has an inherent energy value, investigation of the peak of the energy allows knowing what the element is.



The peak of the characteristic X-ray actually obtained

(2)

ATTACHMENT B

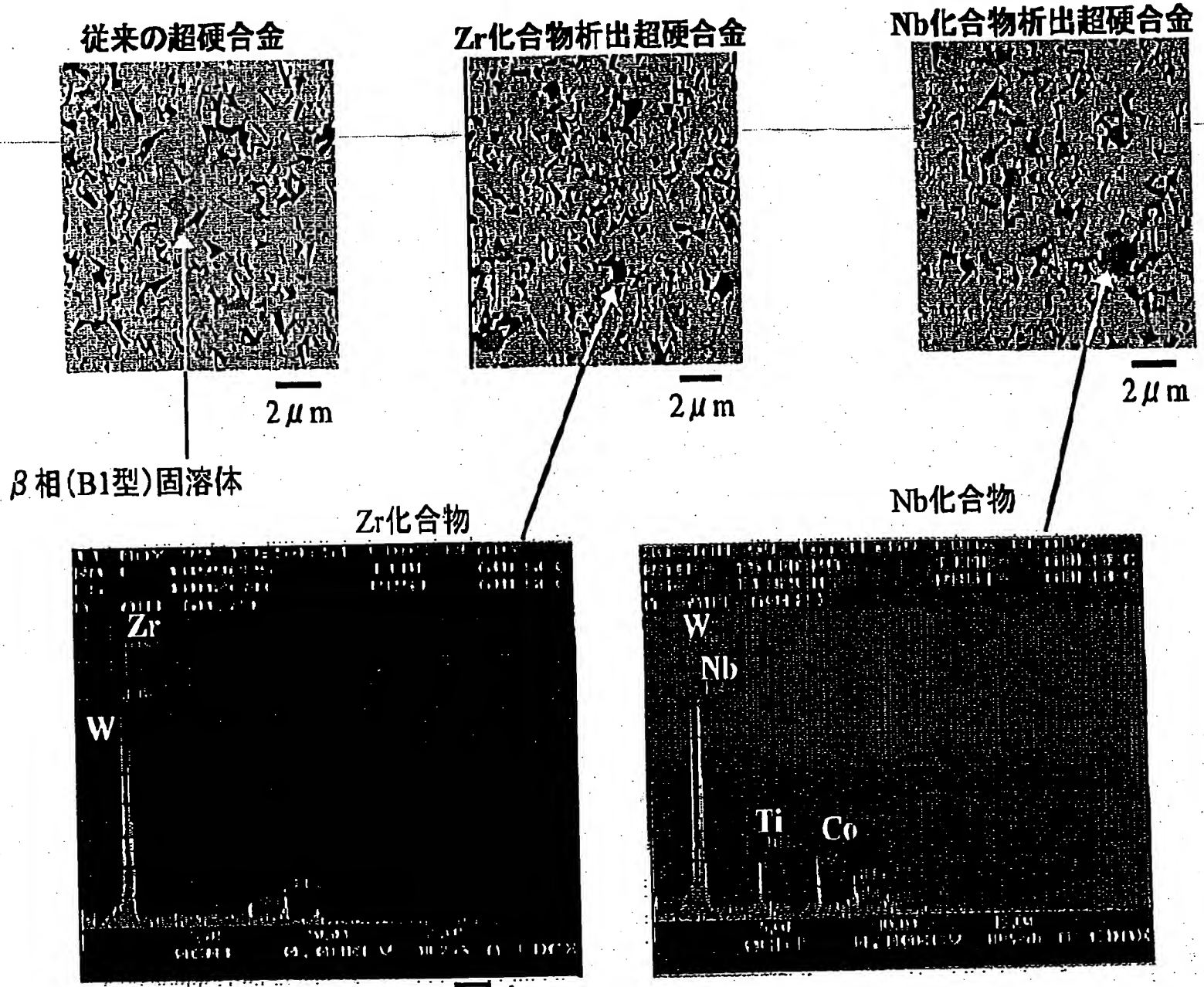


図1

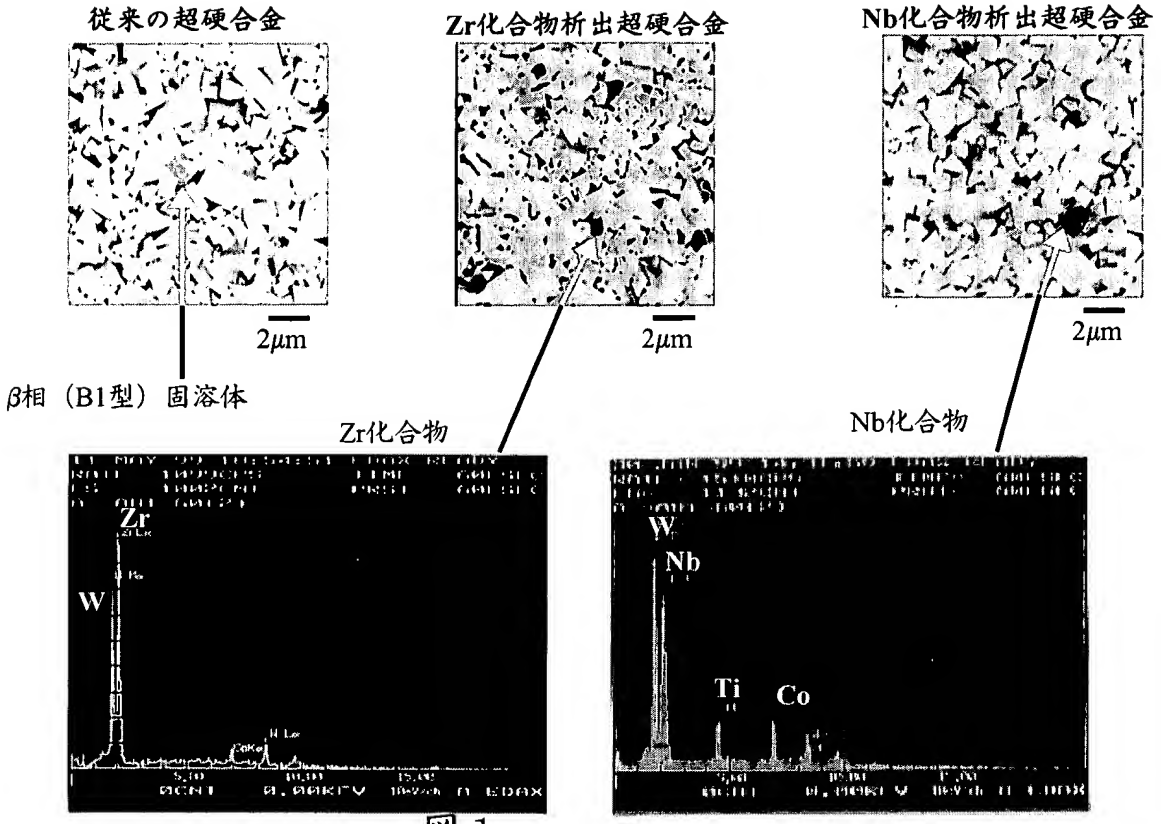

従来の超硬合金
Zr化合物析出超硬合金
Nb化合物析出超硬合金
2μm
2μm
2μm
β相（B1型）固溶体
Zr化合物
Nb化合物
Zr
W
W
Nb
Ti
Co

図 1

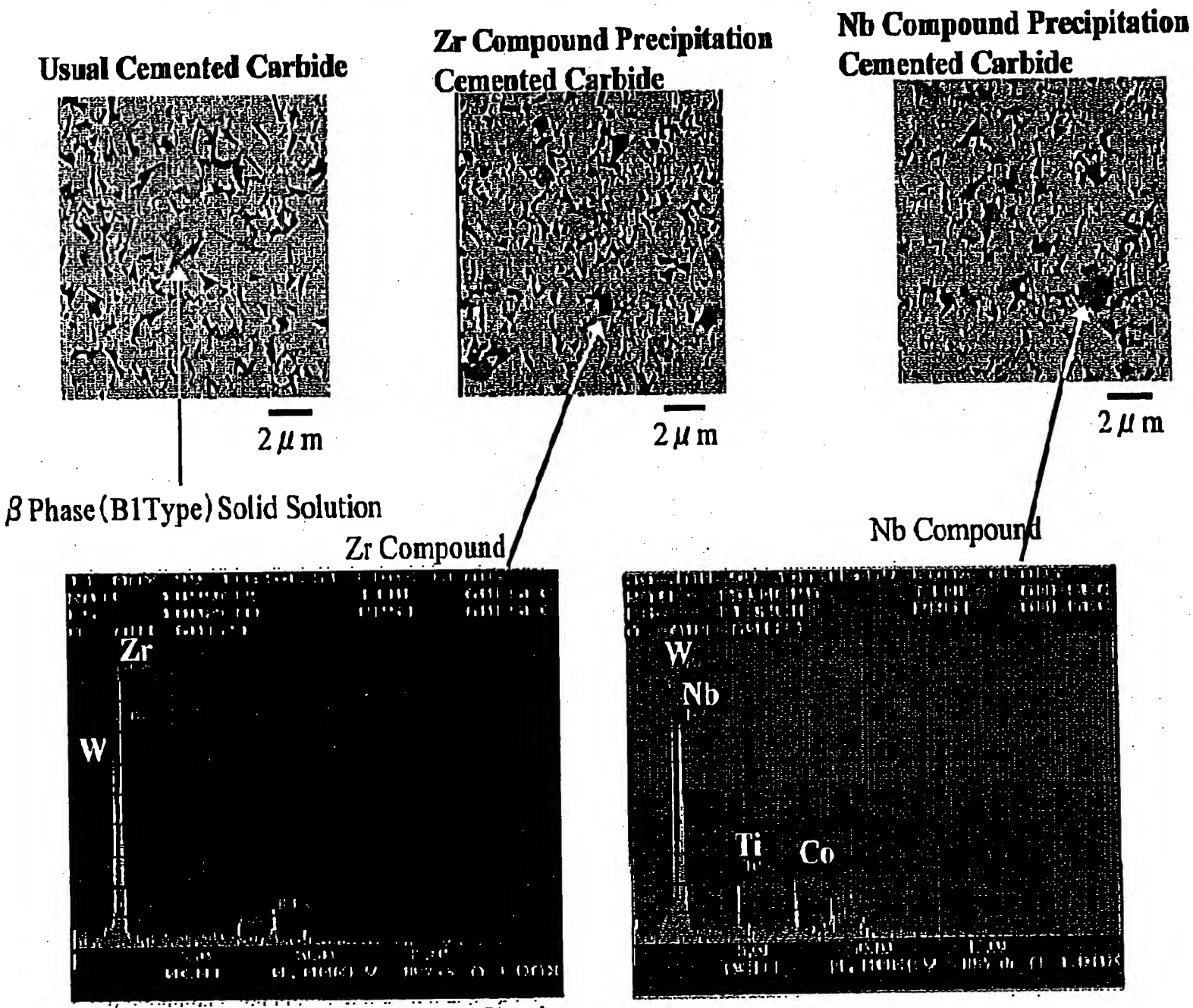


FIG. 1

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:
Daisuke SHIBATA
Serial No: 09/734,275
Confirmation No.: 3724
Filed: December 11, 2000
For: CUTTING MEMBER

Art Unit: 1775
Examiner: Archene A. Turner

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to:
Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450
September 29, 2004
Date of Deposit
Rebecca L. Golden
Name
Signature
09/29/04
Date

AMENDMENT UNDER 37 C.F.R. § 1.312

Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

In conjunction with the issue fee in the present application, please enter and consider the following amendments:

Amendments to the Specification begin on page 2 of this paper.

Amendments to the Claims are reflected in the listing of claims which begins on page 4 of this paper.

Amendments to the Drawings begin on page 5 of this paper and include both an attached replacement sheet and an annotated sheet showing changes.

Remarks begin on page 6 of this paper.

Amendments to the Specification:

Please replace the text at p. 4, lines 15-20 with the following rewritten text:

Fig. 1 is a graph showing X-ray ~~diffraction~~ spectroscopy of a solid solution having a high Zr content obtained in the sample No. 4.

Fig. 2 is a graph showing X-ray ~~diffraction~~ spectroscopy of a solid solution having a high Nb content obtained in the sample No. 7.

Please replace the paragraph beginning at p. 5, line 23 with the following rewritten paragraph:

The solid solution having a high Nb or Zr content is a solid solution having a peak intensity of Nb or Zr, which is 50% or more, preferably 50-120% of a peak intensity of W, in energy-dispersive X-ray ~~diffraction~~ spectroscopy. When the peak intensity of Nb or Zr is 50% or less of that of W, the content of W becomes relatively high. Therefore, the hardness of the alloy can not be enhanced, thereby making it impossible to exhibit high wear resistance and plastic deformation resistance.

Please replace the paragraph beginning at p. 7, line 11 with the following rewritten paragraph:

The term "solid solution other than the solid solution having a high Nb or Zr content" refers to a solid solution of the metal other than Nb and Zr, i.e. one or more metals of Ti, V, Cr, Mo, Hf and Ta, and WC and/or a solid solution of Nb or Zr in a low content, and WC. Regarding the solid solution which does not contain Nb or Zr or which contains Nb or Zr in a low content, the peak intensity of Nb or Zr is 50% or

less, preferably 0-20% of the peak intensity of W, in energy-dispersive X-ray ~~diffraction~~ spectroscopy.

Please replace the paragraph beginning at p. 11, line 24 with the following rewritten paragraph:

Using a X-ray microanalizer (energy-dispersive ~~X-ray diffractometer~~ analysis of X-ray, PV9800 manufactured by EDAX CO.), X-ray ~~diffraction~~ spectroscopy was conducted. A peak intensity of Nb or Zr in the solid solution having a high Nb and/or Zr content and a peak intensity of W were measured, thereby to determine a peak intensity ratio (%) according to the following formula.

Please replace the paragraph beginning at p. 12, line 8 with the following rewritten paragraph:

A graph of X-ray ~~diffraction~~ spectroscopy of a solid solution having a high Zr content obtained in the sample No. 4 is shown in Fig. 1. A graph of X-ray ~~diffraction~~ spectroscopy of a solid solution having a high Nb content obtained in the sample No. 7 is shown in Fig. 2.

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

---

1. (Previously presented) A cutting member comprising:

WC having precipitated therein two or more solid solutions of WC and compounds selected from the group consisting of carbides, nitrides and carbonitrides of metals of the groups 4a, 5a and 6a in the Periodic Table;

and at least one metal of the iron group,

wherein at least one of the two or more solid solutions is a solid solution having a high Nb or Zr content.

2. (Currently amended) The cutting member according to claim 1, wherein the solid solution having a high Nb or Zr content is a solid solution having a peak intensity of Nb or Zr, which is more than 50% of a peak intensity of W, in energy-dispersive X-ray ~~diffraction~~ spectroscopy.

3. (Original) The cutting member according to claim 1, wherein an area ratio of the solid solution having a high Nb or Zr content to the whole solid solution structure is 50% or less.

4. (Original) The cutting member according to claim 1, wherein the two or more solid solutions have an average grain size of 5 .mu.m or less.

5-10. (Canceled)

Amendments to the Drawings:

The attached sheet of drawings includes changes to Figure 1 and Figure 2.

A Replacement Sheet and an Annotated Sheet showing changes to Figure 1 and Figure 2 are attached.

REMARKS:

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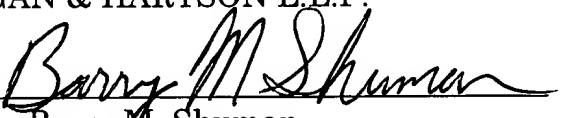
Respectfully submitted,
HOGAN & HARTSON L.L.P.

Date: September 29, 2004

By: 
Barry M. Shuman
Registration No. 50,220
Attorney for Applicant(s)

500 South Grand Avenue, Suite 1900
Los Angeles, California 90071
Phone: 213-337-6700
Fax: 213-337-6701

Fig. 1

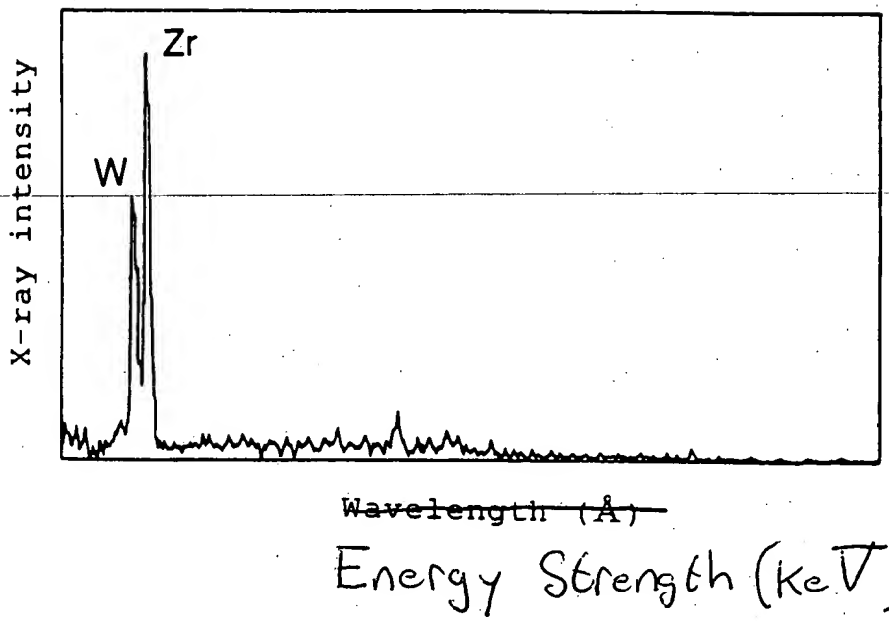


Fig. 2

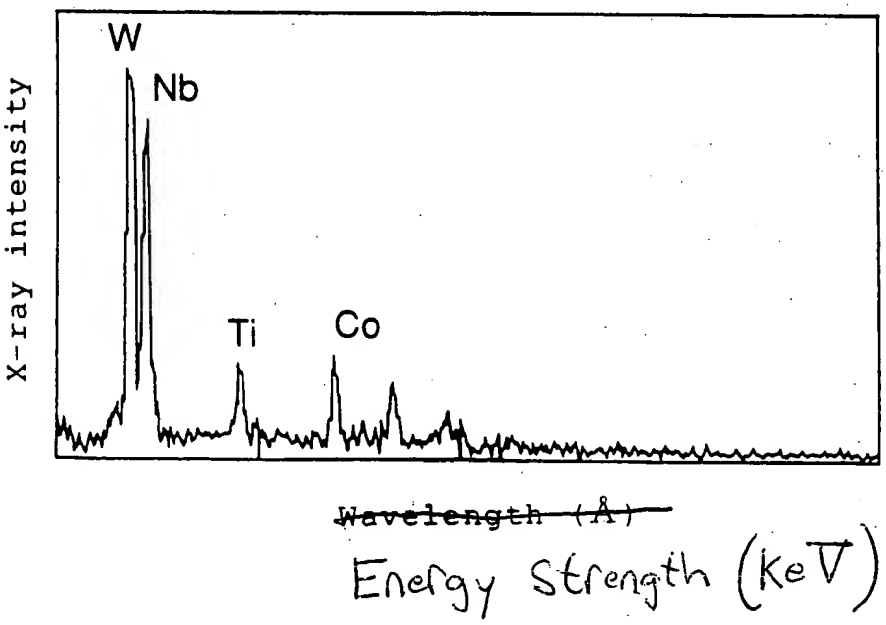


Fig. 1

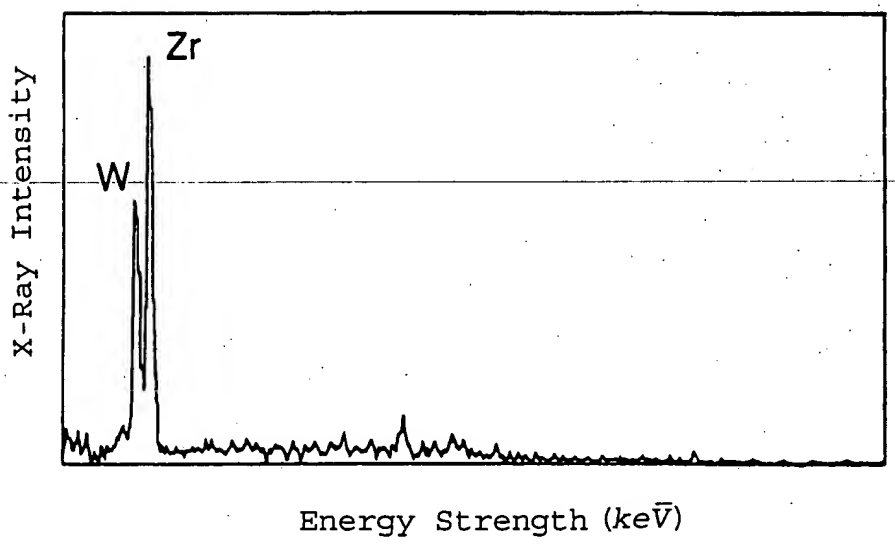
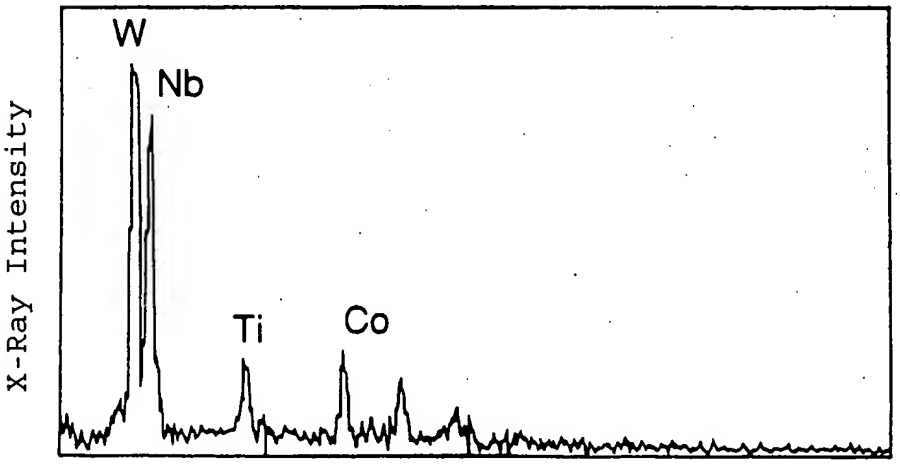


Fig. 2



ItEM-電子顕微鏡の原理

(1)

ATTACHMENT A

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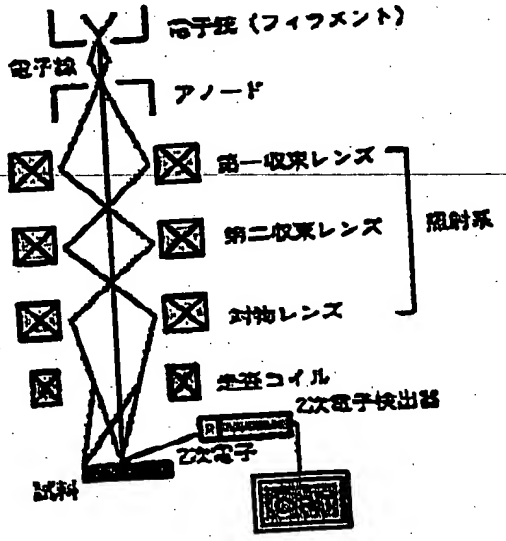

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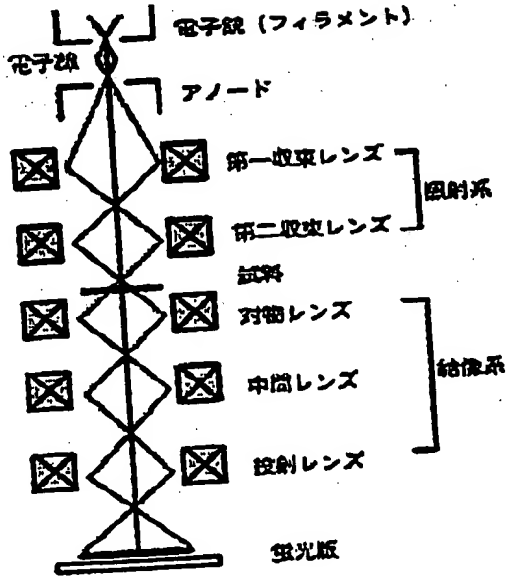

Translati

●エネルギー分散型測定装置(EDS)について

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ItEM-電子顕微鏡の原理

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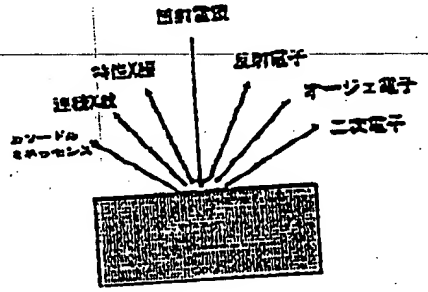
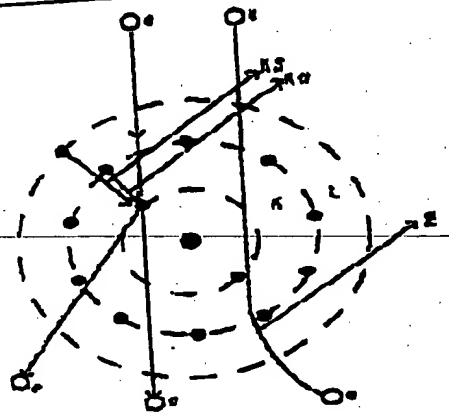
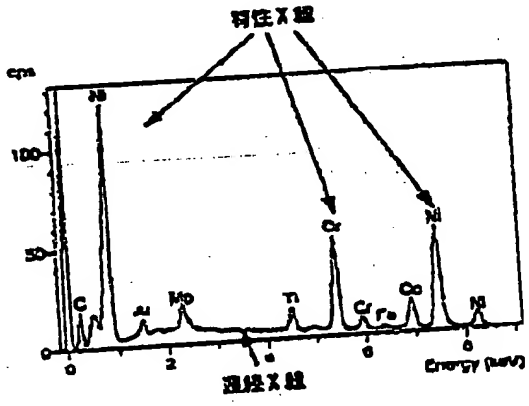


電子線入射による各種信号の発生



特性X線の発生過程



実際に得られる特性X線のピーク

Translation

戻る

(1)

COPY

TRANSLATION-IN-PART of http://www.nims.go.jp/jr_em/japanese/em-morc.html

●As to Energy dispersion measurement equipment (EDS)

This is the method that can investigate kind and amount of elements contained in a sample and distribution of elements by detecting, with a detector which is attached in a scanning electron microscope or a transmission electron microscope, specific X-ray (characteristic X-ray) in each element generated from the observation area that electron beam is irradiated.

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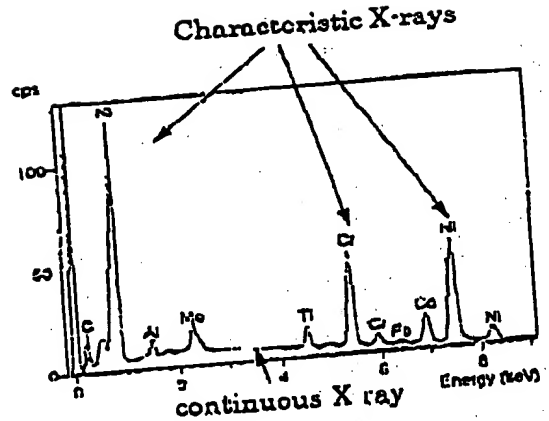
COPY



The peak of the characteristic X-ray actually obtained

(2)

ATTACHMENT B

COPY

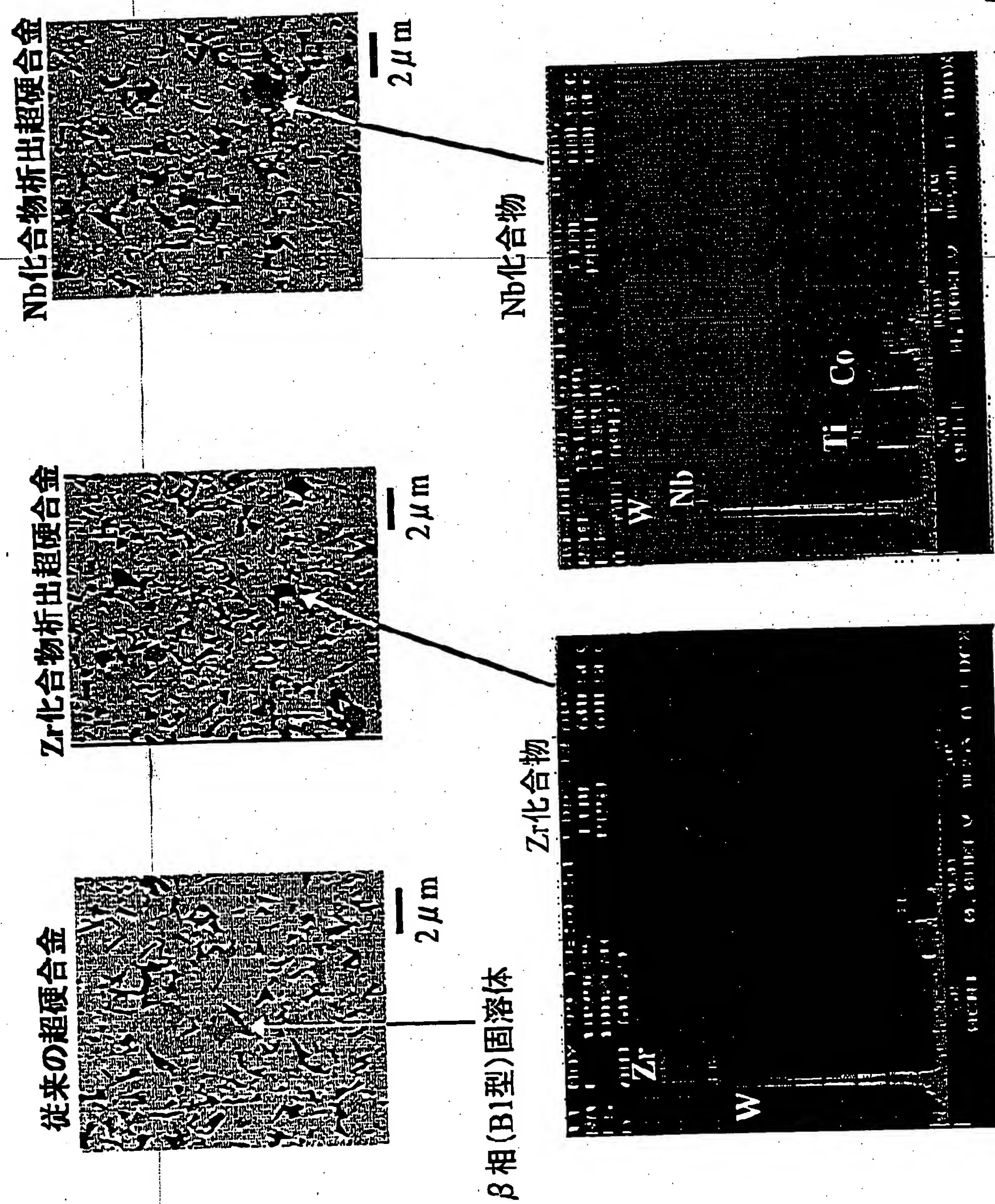


図1

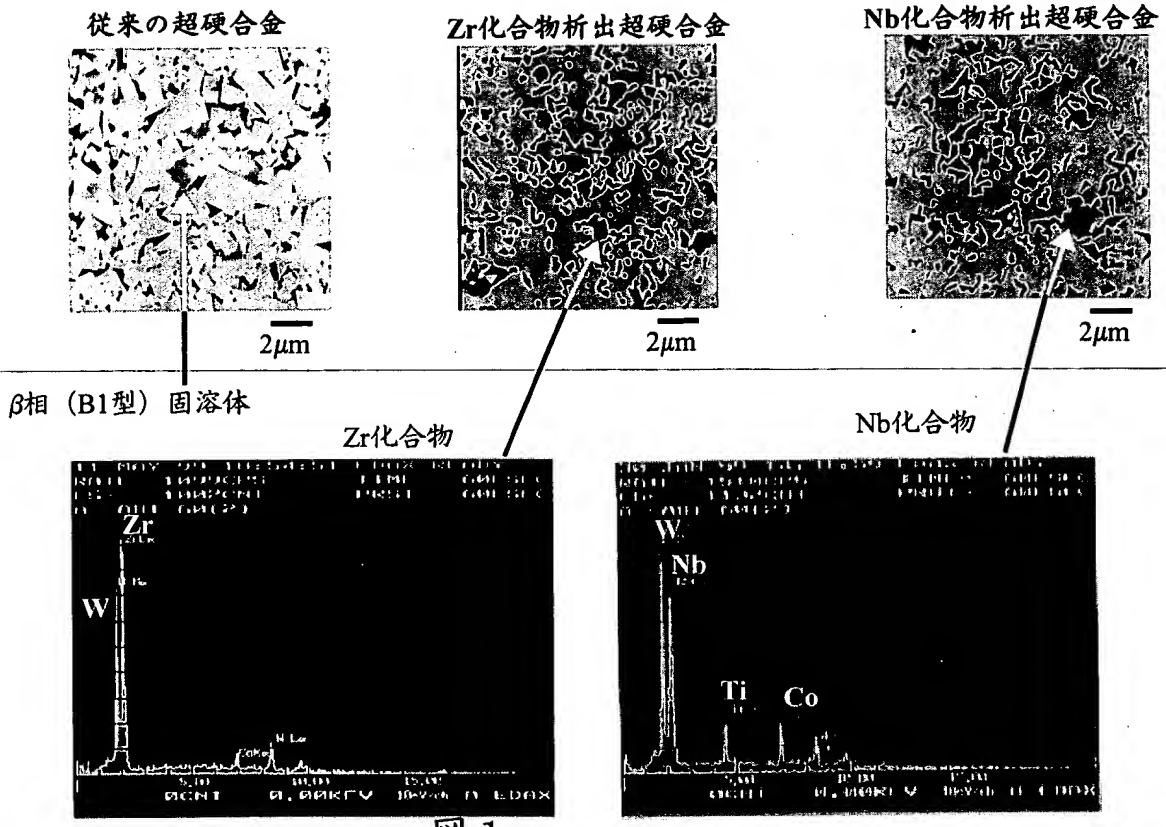

従来の超硬合金
Zr化合物析出超硬合金
Nb化合物析出超硬合金
2μm
2μm
2μm
ββ相（B1型）固溶体
Zr化合物
Nb化合物
Zr
W
W
Nb
Ti
Co

図 1

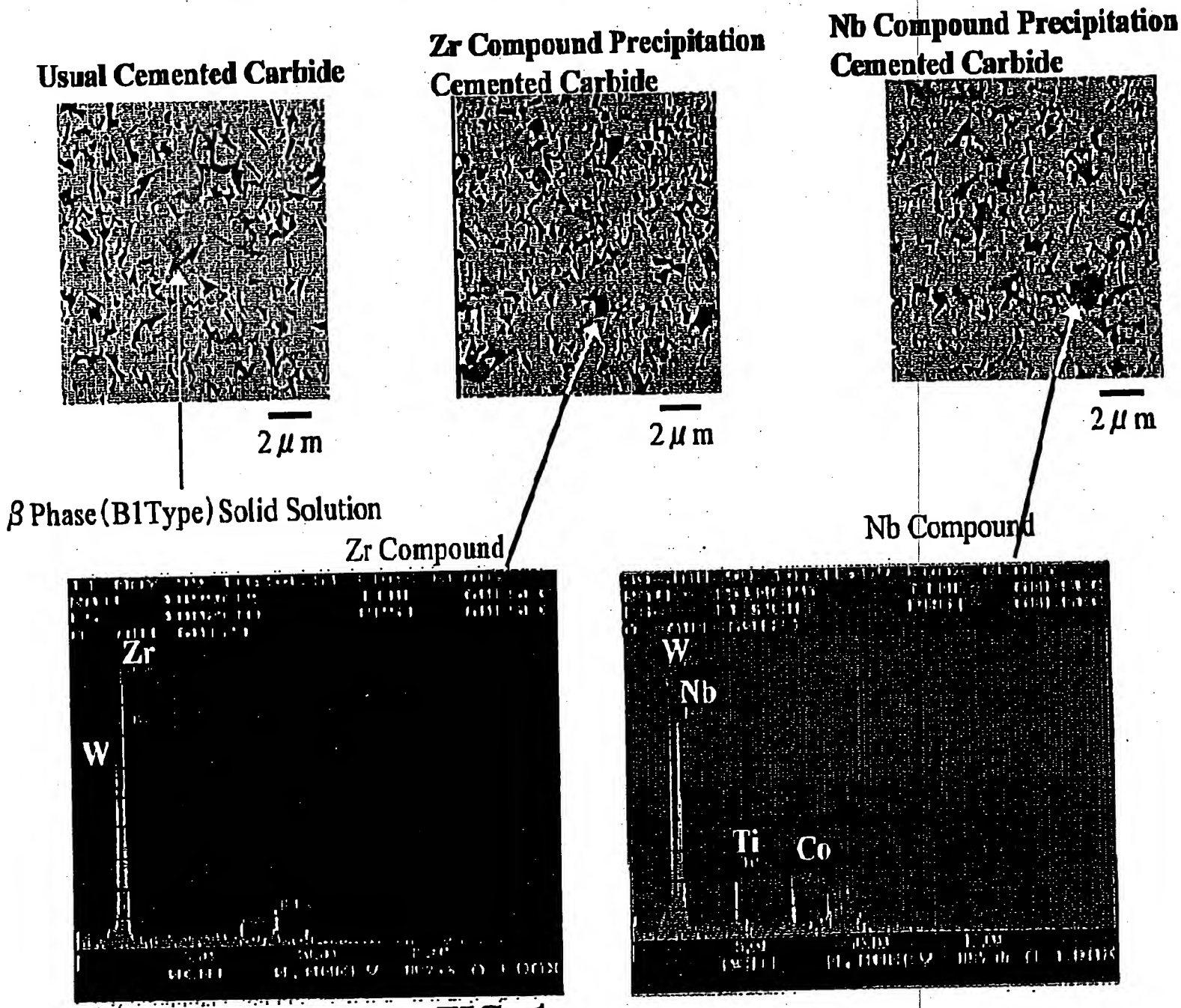


FIG. 1

Fig. 1

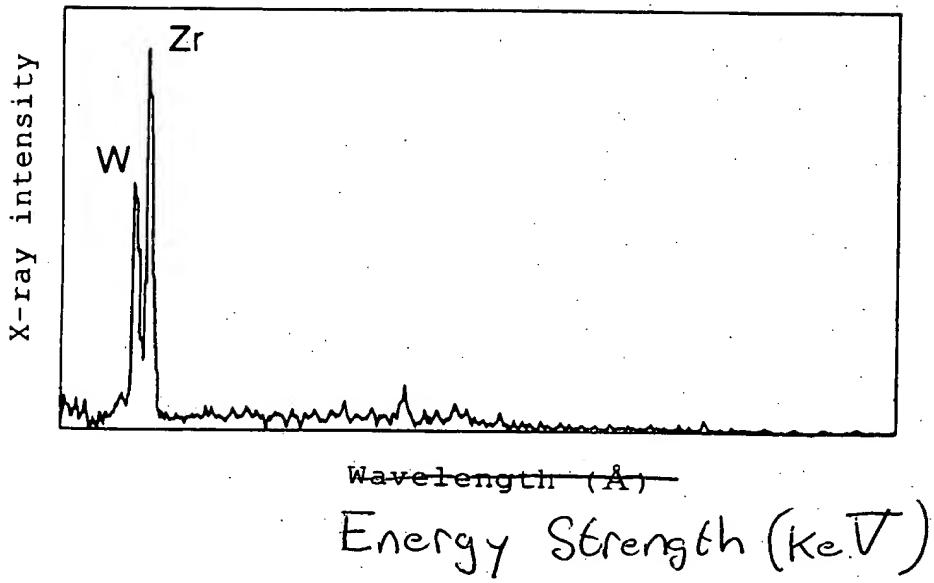


Fig. 2